body of mathematicians representing all countries of the civilised world. Much of the success attending its labours must be attributed to the zeal and energy of the secretary, whose last letter to me, written just a fortnight before his death, anticipated a new departure which would increase the efficiency of the association.

Throughout his life Dr. Macfarlane was keenly interested in educational methods, and at the time of his death was Chairman of the Board of Education in Chatham, Ontario. C. G. KNOTT.

DR. JULIUS LEWKOWITSCH.

WE regret to announce that Dr. Julius Lewkowitsch, the well-known authority on fats and oils, died at Chamonix on September 16, after a short illness. He was born at Ostrovo, in Prussian Silesia in 1857, and had a brilliant university career at Breslau. After graduating as doctor of philosophy at Breslau, Lewkowitsch devoted himself to an academic career; he carried out a considerable quantity of original investigation under Prof. Victor von Richter at Breslau, and subsequently took a position under Prof. Hans Landolt in the chemical laboratory of the Berlin Agricultural High School. At a later date he became assistant to Prof. Victor von Meyer in the University of Heidelberg.

Lewkowitch's first published work consisted in the study of the action of nitric acid on fatty acids, but he soon applied himself to experimental work on stereochemistry, which was at that time a new and undeveloped subject, and was far from assuming the commanding position which it now holds. He was the first to develop the method given by Pasteur for the resolution of externally compensated substances by the action of living organisms, and in 1882 and 1883 prepared the optically active modifications of tartaric, lactic, glyceric, and mandelic acids from the corresponding racemic substances by the action of penicillium glaucum, aspergillus mucor, yeasts, and a schizomycetes. At a later date he attacked the problem presented by the optical inactivity of benzene derivatives, and made many experimental attempts to obtain such substances in optically active modifications.

The brilliance of Lewkowitsch's early experimental work indicates that, had he continued to devote himself to pure science, he would rapidly have achieved a foremost place as a teacher and investigator. About twenty-five years ago, however, he came to this country, became naturalised, and, abandoning his aspirations towards a purely scientific career, entered upon what proved to be his life-work, the development of the industrial technology of fats and oils. At the time of his death he was the first living authority on the vegetable and animal fats and oils; a large number of processes which are widely employed in the utilisation and valuation of these important raw materials were devised by him. His treatise on the "Chemical Technology and Analysis of Oils and Fats" is now in its fifth English edition, and has been published also in French and German; his "Laboratory Companion to Fats and Oils Industries" has a wide sphere of usefulness in English and in its German translation. Lewkowitsch wrote the article on oils and fats in the "Encyclopædia Britannica" and the articles on oils in the last and the current editions of Thorpe's "Dictionary of Applied Chemistry"; his writings on his own subject have set a standard of precise treatment which has been accepted and adopted in later works by others upon this great branch of chemical industry.

Dr. Lewkowitsch served in many capacities upon the Councils of the Chemical Society, the Society of Chemical Industry, the Institute of Chemistry, and the Society of Public Analysts; at the time of his death he was the honorary foreign secretary of the Society of Chemical Industry, and had held the chairmanship of the London Section of the society. In 1909 he received the Lavoisier medal as conférencier of the Société chimique de France; as a Cantor lecturer of the Royal Society of Arts he delivered a course of lectures on fats and oils which, in their published form, are of considerable value, and exhibit the great mastery which he had acquired over our language.

Lewkowitsch was a keen mountaineer; few men possessed so intimate and complete a knowledge as he had gained of the French and Swiss Alps, in sight of which he passed away. He married in 1902, and his widow, with a son and daughter, survives him. W. J. P.

NOTES.

DR. ROUX, director of the Paris Pasteur Institute, has been made a grand officer of the Legion of Honour.

THE death occurred on September 15, at the age of fifty-nine, of Dr. Louis Merck, senior partner of the firm of E. Merck, Darmstadt.

IT is stated in *The Lancet* that Mr. W. F. Fiske has been asked by the Tropical Diseases Committee of the Royal Society to investigate the life-history of the tsetse flies in Uganda.

THE *Chemist and Druggist* for September 20 contains the reproduction of a photograph of the bronze statue of Dr. Ludwig Mond, which was unveiled by Sir John Brunner, Bart., on September 13, and was alluded to in our issue of September 11 (p. 48).

THE death is reported, in his sixty-eighth year, of Prof. Lucien A. Wait. On graduating at Harvard in 1870 he was appointed assistant professor of mathematics at Cornell University. In 1877 he became associate professor, and in 1890 full professor. From 1895 to 1910 he was head of the department of mathematics.

ACCORDING to *Science*, a national museum is to be established in the city of Santo Domingo for the purpose of retaining and preserving in the country objects and relics of historical character connected with the discovery and development of the country.

The museum is to occupy the old palace known as the house of Don Diego Colon. The sum of 20,000 dollars has been appropriated by the National Congress for repairing the building.

There is no doubt as to the efficiency of the radium emanations in the cure of certain forms of superficial cancer, ulcers, &c. It is now stated that the emanations of mesothorium, derived from the waste in the manufacture of incandescent gas mantles, possess similar properties, but in an enhanced degree, and efforts are being made to prepare a sufficient supply of the material so that a thorough trial of it may be made.

We notice with regret the death, on September 18, at eighty-five years of age, of Mr. Samuel Roberts, F.R.S., president of the London Mathematical Society from 1880 to 1882, and De Morgan medallist in 1896. Another well-known mathematician whose death, on September 19, is announced is Mr. John Greaves, bursar and senior mathematical lecturer at Christ's College, Cambridge, and author of "A Treatise on Elementary Statics."

The death is announced, at the age of sixty-seven, of the eminent French surgeon, Prof. Antonin Poncet, who in 1882 was appointed to the chair of operative medicine at Lyons, and in 1895 was elected to the Academy of Medicine. He was the author of many medical works dealing with diseases of the bones, and was well known for his investigations into the cause of death of Napoleon, Richelieu, Rousseau, and many other famous men.

It was briefly announced in our issue for September 11, that the importation into the United States of the plumage of wild birds, raw or manufactured, save for scientific or educational purposes, is by the new Tariff Bill prohibited. We now learn from Mr. W. T. Hornaday, of the New York Zoological Park, that the prohibition movement was inaugurated and carried through by the New York Zoological Society and the National Association of Audubon Societies. It would be well if their example were copied in this and other countries.

We learn from *The Pioneer Mail* that Sir Aurel Stein, K.C.I.E., has been deputed by the Government of India, with the sanction of the Secretary of State, to resume his archæological and geographical explorations in Central Asia and westernmost China. For his journey to the border of Chinese Turkestan on the Pamirs Sir Aurel Stein is taking on this occasion a route which offers special interest to the student of the geography and history of the Hindu Kush regions. It leads through the Darel and Tangir territories which have not been previously visited by a European, and which only recent political developments have brought under British influence. The Survey of India Department has deputed with Sir Aurel Stein his old travel companion Rai Bahadur Lal Singh, and a second surveyor to assist him by topographical work.

As was announced in Nature of September 11, the eminent entomologist, Dr. Odo Morannal Reuter, of Abo, Finland, Emeritus professor of zoology at Helsingfors University, died on September 2 in his sixty-fourth year. As an entomologist Prof. Reuter's name was known throughout the world as a leading authority on the Hemiptera-Heteroptera, whilst he was also a worker in the more obscure groups, the Collembola (spring-tails), Psocidæ and Thysanoptera (thrips). About five years ago it was learned from Prof. Sahlberg that his colleague, O. M. Reuter, had been sadly stricken with blindness, yet, despite this great affliction, he plodded on with the aid of a secretary, and shortly before his death a work—so written—on the habits and instincts of solitary insects saw light at Stockholm. His work was characteristically thorough, and though his contribution to zoological literature numbered about 480 publications, large and small, and included a number of works on animal psychology and practical entomology, he was also a writer on literary subjects and a poet of high attainments and merit. In this country he will be missed by many, and it is pleasing to know that the highest honour British entomologists can bestow—the honorary fellowship of the Entomological Society of London—was conferred upon him in 1906.

In vol. iii. of the publications of the Babylonian section of the University Museum of Pennsylvania Mr. J. A. Montgomery contributes an elaborate memoir on a collection of Aramaic incantation texts from Nippur. These bowls were found above the stratum of the Parthian temple, which was destroyed and became covered with sand, and was occupied by small ascetic communities of Jews and Mandæans probably attracted to this deserted place by motives of religious community life. They appear to date from approximately 600 A.D. The importance of the present discovery lies in the fact that this bowl magic is in part the lineal descendant of ancient Babylonian sorcery, while at the same time the unexpected result is arrived at that it takes its place in the great field of Hellenistic magic which pervaded the whole of the western world at the beginning of the Christian era. The monograph is a scholarly piece of work, and will be indispensable to all students of Oriental magic.

The *Reading University College Review* for August, an attractive volume, includes an article on bovine tuberculosis in man, by Dr. Stenhouse Williams, which gives a good summary of the subject. He concludes that the bovine type of tubercle bacillus is the cause of one-third of the cases of tuberculous disease other than the pulmonary at ages 0-16 years, which corresponds to about 4000 deaths per annum in this country.

To the July-August issue of *Naturen* Mr. P. A. Øyen contributes an illustrated article on remains of the mammoth and the musk-ox in Norway, with a discussion as to the horizons in which they respectively occur.

We have received a copy of a fifth edition of the late Mr. T. Southwell's admirable guide to the Norwich Castle Museum, brought up to date by Mr. F. Leney, the curator. Among the illustrations are figures of the stuffed skin and egg of the great auk, which form two of the chief treasures of the museum. To Prof. McIntosh we are indebted for a copy of a reprint of his sketch of the Natural History Museum of the University of St. Andrew's, originally published in the Museum's Journal.

According to the report of the Madras Museum for the past year (issued by the Educational Department), a large collection of marine organisms has been obtained from the coral reef at Kilaharai, in the Ramnad district, the examination and classification of which are expected to occupy a considerable period. The superintendent also records the third or fourth specimen (it is not quite clear which) of the great snipe (*Gallinago major*) killed in India; all these appear to have been obtained since the publication, in 1898, of the fourth volume on birds in the "Fauna of British India," as the species is not mentioned in that work.

In an article on the ancestry of Edentate mammals published in a recent issue of the American Museum Journal (vol. xii., pp. 300–303), Dr. Matthew, after mentioning that armadillos are probably the most primitive existing members of the group, and that "armadillos without armour" occur in the early N. American Tertiary, observes that although the latter and the tæniodonts of the N. American Eocene cannot be regarded as direct ancestors of the typical S. American edentates, yet they suggest the possibility that the group originally came from N. America, and penetrated to S. America about the beginning of the Tertiary, where it developed into a host of new forms.

Great interest attaches to the description by Dr. W. D. Matthew in vol. xxxii., art. 17 (pp. 307–314), of the Bulletin of the American Museum of Natural History, the imperfect skull of a new genus and species (*Palaeoryctes puercensis*) of the so-called zalamdodont insectivorous mammals from the Puerco, or Basal, Eocene of New Mexico. At the present day that group is represented by the Solenodontidæ of Haiti and Cuba, the Potamogalidæ of Equatorial (Dr. Matthew, judging from his map, seems to be unaware that the "otter-shrew" occurs in the eastern as well as in the western part of the forest-zone) and the Chrysochloridæ, or golden moles, of southern, eastern, and central Africa, and the Centetidæ, or tenrecs, of Madagascar. In 1891 the extinct genus Necrolestes, more or less nearly related to the Chrysochloridæ, was described from the Patagonian Miocene. At that time fossil forms were unknown from the northern hemisphere, which led to the suggestion that the group was essentially southern; but between 1903 and 1907 five extinct genera were recorded from the N. American Tertiary. The new genus now described serves to show the great antiquity of the tritubercular type of molar characteristic of the zalamdodonts; and also, if rightly associated with that family, indicates that the Centitidæ are the oldest existing group of placental mammals.

Amongst the familiar sporozoan parasites known as gregarines, one genus, Porospora, has always stood apart from all others by reason of the possession of peculiar and anomalous characteristics. The genus comprises species parasitic in Crustacea, and *P. gigantea,* parasite of the lobster, is the largest gregarine known. Recent researches have shown that the peculiar "gymnospores," so-called, of these gregarines are not true spores at all, but clusters of merozoites, and that the apparent sporogony of these parasites in their crustacean hosts is really a process of non-sexual schizogony, different from that of all other gregarines. The question then arose: Where and under what circumstances does the true sporogony take place? The answer has now been given by the distinguished French investigators, Messrs. Léger and Duboscq, who have discovered that the sexual cycle and sporogony of Porospora takes place in bivalve molluscs, and is no other than that of the curious parasite described many years ago by Aimé Schneider under the generic name Nematopsis, a genus of which the systematic position has been hitherto quite uncertain. Thus *Porospora portunidarum*, parasitic in crabs, has its Nematopsis-phase in *Cardium edule,* the common cockle, in which host the parasite produces a single spore, containing a single vermiform sporozoite, in the gills of the mollusc. A preliminary account of the development of this species, illustrated by nineteen text-figures, is published in the *Comptes rendus des séances de la Société de Biologie* (vol. lxxv., p. 95).

We have received the concluding numbers of the sixteenth volume (for 1912) of the *Bollettino* of the Italian Seismological Society. The complete volume contains eleven papers, the more important of which deal with the recent eruption of Etna, the luminous phenomena associated with the Valparaiso earthquake of 1906 (Nature, vol. xc., p. 550), and the sea-waves of the Calabrian earthquake of 1907 (vol. xci., p. 327). The greater part of the volume, however, consists of the notices of earthquakes observed in Italy during the year 1909, compiled by Dr. G. Martinelli. These notices occupy more than six hundred pages, and their value has been increased by several improvements recently made. The constants of the seismographs used in twenty-nine Italian observatories are given in an appendix; the notices relating to different earthquakes are separated by a space (it would be still more useful if they were numbered); the earthquakes, with the exception of those recorded by a single instrument or from one place only, are named according to the districts chiefly affected by them, and of these an alphabetical index is added.

A recently issued Bulletin (No. 54) of the Bureau of American Ethnology, by Messrs. Hewett, Henderson, and Robbins, deals with the Rio Grande valley, an arid region in New Mexico. The bulletin contains three papers; the first two, on the physiography and general geology respectively, are more or less introductory to the third, which deals with the climate and climatic changes. The evidence for the latter is (1) archæological, (2) botanical, and (3) geological. (1) There are great numbers of ruins in the country, many of them far from present known sources of water, and even as late as the coming of the Spaniards the population seems to have been denser than now. (2) Study of the trees shows that the rock pine and the piñon pine are the most widespread, the latter occupying the drier situations. The boundary between these two species is shifting towards the moister regions, indicating that the area which is too dry for the rock pine to inhabit is increasing. (3) Geologically, the authors have to take a wider field. Of chief importance is the evidence that the whole of the south-west States have suffered a great diminution of their mountain glaciers and enclosed lakes, commencing several thousand years ago, and probably still in progress, as shown by measurements in the last few decades. No single line of evidence is conclusive, but the convergence of so many, coupled with the experience of observers in other lands, renders dessication in this region in human times very probable. In connection with the authors' suggestion for the careful measurement of the fluctuations of land-locked lakes, it may be noted that such records are now being kept in the British colonies in tropical Africa. The work is illustrated with a number of very clear photographs, but the omission of the names of the months and the scales of units in the diagrams of monthly rainfall and temperature is unfortunate.

WE have received the "Pilot Chart" of the North Atlantic Ocean for September, published by the United States Hydrographic Office, containing similar useful information relating to winds, currents, &c., to that included in the "Meteorological Charts" formerly published by the Weather Bureau, but now discontinued (NATURE, September 11). An interesting account is given of observations on ocean temperatures in the vicinity of icebergs and in other parts of the ocean by officers of the U.S. Bureau of Standards, with illustrations of the temperature equipment and of samples of the records obtained. Practically continuous temperature readings were obtained from June 4 to July 10, 1912, and these show that the variations in parts of the ocean far removed from ice are often as great and sudden as in the vicinity of icebergs. The authors consider that the question is still in doubt whether these influence to any considerable extent the temperature of sea-water at a mile or so distant.

AN interesting article on evaporation in the great plains and intermountain districts as influenced by the haze of 1912, by Messrs. L. J. Briggs and J. O. Belz, of the Bureau of Plant Industry, appeared in the Journal of the Washington Academy of Sciences of August 19. The haze was presumably due to the eruption of Mount Katmai (Aleutian Islands) on June 6–7 of that year, during which volcanic ashes fell at Sitka, 700 miles distant, and the sun was obscured for a time. It gave rise to a marked diminution in the intensity of solar radiation, which was particularly noticed in subsequent months at the Mount Wilson, Mount Weather, and Madison observatories in the United States. The authors, who had been engaged in evaporation measurements during the last five years, deemed it desirable to determine to what extent this reduction of solar intensity affected the evaporation (not forgetting that this is also greatly influenced by other factors). Tables of monthly normal evaporation for fifteen stations show that during four months following the eruption the average reduction was about 10 per cent. This reduction in the mean evaporation, although somewhat less than the observed reduction in solar intensity, appears to afford an approximate measure of the reduction of the latter at the earth's surface.

THE *Scientific American* (vol. cix., No. 5) contains two illustrated articles on the modern developments of the electric furnace. In the first (p. 84) an account is given of recent patents covering improvements in the electric arc as used in the purification of steel and iron and in the production of compounds of nitrogen from the air; whilst in the second a special account is given of the electrical production of steel, from the early experiments of Siemens to the thirty-ton furnace of to-day. Illustrations are given of the Stassano arc furnace in use at Turin, of the Kjellin and the Röchling-Rodenhausen induction furnaces, and of the Heroult 15-ton arc furnace in use at the works of the U.S. Steel Corporation.

AËRONAUTICAL science in America receives fresh recognition in the decision of the Smithsonian Institution to reopen the Langley Aërodynamical Laboratory. The first serious contribution from the scientific side of aëronautics is to be found in the work of Langley, the necessary funds being provided by a Governmental grant; had the light petrol motor come into existence twenty years ago, it is probable that the Langley Laboratory would never have been closed, and would now be the leading aëronautical laboratory in the world. The Smithsonian Institution is a private concern, although closely connected with the U.S. Government departments. For the present it will be dependent on private donations for its income for aëronautical research, though in time it is hoped to receive a Governmental grant in aid. Apparatus useful in aëronautics already exists in the U.S. Bureau of Standards, and the U.S. Weather Bureau, with which the Langley Laboratory will be closely connected, and financial support is primarily needed for the construction of two wind tunnels and the necessary model-making apparatus. In addition to experiments on models an aircraft field laboratory is proposed, for measurements of stress, moments of inertia, &c., and for the adjustment and repair of several full-scale land and water aëroplanes.

IN the July number of *The Biochemical Journal* (vol. vii., No. 4) Mr. Egerton C. Grey demonstrates the production of acetaldehyde during the anaerobic fermentation of glucose by *Bacillus coli communis*, and states that, by artificial selection by means of growth on sodium chloracetate, strains of the original organism can be obtained which produce either a greatly diminished amount of the aldehyde or none at all. As this diminution is accompanied by a falling-off of the production of alcohol and carbon dioxide, it is probable that the aldehyde is a primary, not a secondary, product of fermentation, and that the process of alcohol formation by *B. coli communis* is analogous to the alcoholic fermentation set up by the zymase of yeast.

IN the current number of the *Berichte* (No. 11, p. 2401), Prof. Willstätter and L. Zechmeister publish an important communication on the quantitative conversion of cellulose into dextrose by means of cold, fuming hydrochloric acid of sp. gr. 1·204° to 1·212°, containing from 40 to 41·4 per cent. of hydrogen chloride. A problem has thus been solved which for more than one hundred years has been vainly attempted by the use of hot mineral acids and other means. Although ordinary concentrated hydrochloric acid containing 37·6 per cent. of hydrogen chloride does not dissolve cellulose but merely disintegrates the fibre and causes gelatinisation, the more concentrated acid containing 40 per cent. rapidly dissolves it, and after twenty-four to forty-eight hours 95 to 96 per cent. of the theoretical quantity of dextrose is present in the solution. The course of the hydrolysis has been followed by observing the specific rotatory power and copper-reducing value of the solution in successive intervals of time. In this way it was found that the cellulose at first dissolves in an optically inactive form, thus differing entirely from starch, which gives a highly dextro-rotatory modification from the start. Only after one hour is a slight dextro-rotation to be observed, which progressively increases; in the early stages the product, which can be precipitated from solution by water or alcohol, is of a dextrin-like character, but without either reducing power or specific rotation. The solution gradually develops reducing properties as the specific rotation increases, but during the first six hours the amount of "dextrose" calculated from the reducing power is much less than that calculated from the change of rotation. It is thus probable that a complex, optically active, but non-reducing sugar is formed first, and that this is later further resolved into dextrose. One of the most striking observations recorded in the paper is the very high specific rotation shown by dextrose when dissolved in concentrated hydrochloric acid. In 41·4 per cent. hydrochloric acid $[\alpha]_D^{16^\circ}$ was found to be 106°, which approximates to that of the so-called α-form of dextrose (110°), the ordinary value observed in aqueous solution for the equilibrium mixture of α- and β-forms being 52·5°. In 44·5 per cent. hydrochloric acid, however, the extraordinarily high value of 164·6° was observed for $[\alpha]_D$ at 5° C.

No. 29 of *Scientia* contains a number of articles of general scientific interest. Dr. E. E. Fournier d'Albe writes on interstellar space, Dr. A. Findlay gives a short account of the phase rule and its applications, and Mr. Léon Fredericq contributes an interesting summary of the methods by which animals utilise chemical and physical forces as means of defence. Mr. E. Rignano discusses the problem of the evolution of reason, and G. Cardinali traces the influence of Hellenic culture on the development of Roman civilisation.

OUR ASTRONOMICAL COLUMN.

VARIABLE NEBULÆ.—M. Borrelly's recent announcement in the *Comptes rendus* that Hind's nebula appeared to be passing through a period of maximum is now followed (No. 9, *Comptes rendus*) by a note from M. G. Bigourdan incorporating a list of the dates of published measures together with the names of the observers dating from Schönfield's observations, July 26, 1861. Attention is directed to the importance of confirming M. Borrelly's observation.

COMET (1913*b*) METCALF.—The following is the ephemeris of Metcalf's comet as taken from the *Astronomische Nachrichten*, No. 4682:—

12h. M.T. Berlin.

	R.A. h. m. s.	Dec. ° ′	Mag.
Sept. 25	3 41 54	+76 44·2	—
26	3 6 0	77 17·7	—
27	2 25 33	77 31·4	8·4
28	1 42 38	77 16·6	—
29	1 0 15	76 40·9	—
30	0 21 36	75 33·3	—
Oct. 1	23 47 1	74 1·0	8·2
2	23 18 26	72 6·0	—

The above ephemeris has been calculated by Prof. Kobold from the observations on September 2, 6, and 10, which gives quite a new set of parabolic elements and makes the places of the comet very different from those calculated from his previous elements.

The present elements are as follows:—

T = 1913 Sept. 13·9168 M.T. Berlin.

$$\left.\begin{aligned}\omega &= 117^\circ\ 7'\ 51''\\ \Omega &= 157^\circ\ 9'\ 59''\\ i &= 143^\circ\ 24'\ 25''\end{aligned}\right\}1913\cdot0.$$

$\log q = 0\cdot133805$

As this comet is getting brighter and higher up in the sky, it should be observable with telescopes of small aperture.

COMET 1913*c* (NEUJMIN).—This comet, discovered by Neujmin, is becoming fainter, being now nearly of the 12th magnitude. For the sake of those who wish to follow it further with larger telescopes, the following ephemeris by Herr M. Ebell, taken from a supplement to the *Astronomische Nachrichten*, No. 4680, is given:—

12h. M.T. Berlin.

	R.A. (true) h. m. s.	Dec. (true) ° ′	Mag.
Sept. 25	23 39 58	+6 4·7	11·8
,, 26	23 39 35	6 18·8	
,, 27	23 39 14	6 32·4	
,, 28	23 38 54	6 45·4	
,, 29	23 38 36	6 57·9	
,, 30	23 38 19	7 10·0	
Oct. 1	23 38 3	7 21·6	
,, 2	23 37 49	7 32·7	12·1

ANNALS OF THE BUREAU OF LONGITUDES.—Containing accounts of the inception, organisation, programmes, and transactions of two international conferences which have led to results of the highest practical importance in applied astronomy, the ninth volume of the Annals of the Bureau of Longitudes attains the distinction of being not only a valuable document in the history of that science, but also of marking a stage in the growth of international cooperation in scientific work. Of the successful issue of the Congrès des Ephémérides, let us recall only the sixth of the seven general resolutions adopted, namely, that the names of stars should be accompanied by designations of their spectral type after the notations of Pickering. The work last autumn of the Conférence Internationale de l'Heure, of course, chiefly centred around the employment of wireless telegraphy not only in the distribution of time, but also in the service of meteorology. The value of these applications is attested both by the rapidly increasing numbers using the time-signals, especially on land, and by the fact that it has recently been found necessary to add more than a dozen stations to the original six for which the meteorological elements were distributed on the resolution of the conference.